

Profile

 Russian engineer **Gennady Vasilchenko-Malishev** grew up surrounded by scientists looking to break boundaries. What he learned from that experience has informed his career as one of the world's leading experts in structural glass design. Interview by Jackie Whitelaw.



A few years ago, Sky ran a fictional TV series titled 'A Town Called Eureka' based on the premise that fun that could be had with scientists all at the top of their game, living in the same place and working for the same employer. It was great.

When Gennady Vasilchenko-Malishev describes his upbringing in the Russian town of Dubna, it sounds very similar. Dubna was the site of a small-scale hadron collider project that began in the 1950s, since eclipsed by the work at CERN in Switzerland. 'There were lots of scientists from East Germany, Poland, Czechoslovakia and Mongolia working there when I grew up in the 1970s and 1980s. It was very cosmopolitan, very cool and I think it turned me into an "international" person, opening my mind to other cultures and underpinning my career.'

Physicists, mathematicians and programmers were the main population of the small academic town, pushing the boundaries of nuclear research. Their discoveries culminated in the 105th element in the periodic table – named 'dubnium' after his home town.

Vasilchenko-Malishev found the nuclear research and quantum



Figure 1
Steel-and-glass
structural stairs for
Mariinsky II Theatre

physics that pervaded the Dubna community somewhat overwhelmingly abstract and decided to stick to Newtonian physics in his future career. However, the academic curiosity, passion and dedication to scientific research rubbed off on him. He has now carved out a career as a world leader in structural glass and is one of the 'go to' people when a project needs a eureka moment.

Significant schemes have included steel-and-glass structural stairs for the Diamond Schmitt Architects-designed Mariinsky II Theatre in St Petersburg, Russia (Figure 1) and 11 steel-and-glass crystal sculptures for the town of Omsk in Siberia. Both projects won Structural Awards, the first in 2013 and second in 2015. Another striking project, from 2013, is a 13m high glass box (Figure 2) for the Daman Buildings in Dubai,

which may be the tallest self-supporting glass box in the world. And most recently he has worked with Guarneri Architects on a timber, steel and glass project to reimagine a Victorian villa in Clapham, London (Figure 3), which was shortlisted for the AJ Retrofit Awards and the Structural Awards 2017.

'Generally, clients come to me when they need creative support for an idea and to resolve technical issues,' he says. 'I particularly love working with glass because it is a less forgiving material, you need your wits about you. And it is the only structural material that gives you almost full transparency. It can be used to create the most minimalist structures possible – you can make things float.'

Unusual beginnings

Vasilchenko-Malishev has his own practice, Malishev Engineers,

based in Bath, a long way from where he started out, studying at the state university of civil engineering in Moscow with a specialism in earthquake engineering.

'I went to a school focused on art and music and an obvious choice of career might have been architecture,' Vasilchenko-Malishev says. 'But the subjectivity of architecture scared me; the opinion of others and being "in vogue" is so important to the success of a project and people like it or they don't. I preferred the objectivity of engineering – something either works or it doesn't.'

Vasilchenko-Malishev, now 43, was at university in the 1990s, just after the fall of the Berlin Wall and the break-up of the Soviet Union. The latter, particularly, was a shock he felt directly. 'All the institutions were in disarray, I remember our laboratory had no

money to do any physical testing for earthquake engineering, no basic equipment like a shake table. So we did a lot of theoretical maths and physics instead, which was kind of fun but too abstract and far from reality.

'A lot of the academics were stranded in the new economic reality; they had no idea who was paying them and suddenly all the professors had to start running their own practices to survive. It was a pretty strange period, maybe a bit like Brexit. There were massive risks, things didn't always go right, but there was also incredible opportunity. Looking back, I realise it was a generational thing. I would say mine was the first to embrace the change without being scared.'

One of the opportunities that arose was the arrival in Moscow of engineering companies from the UK. Vasilchenko-Malishev's first job was with Waterman in the city. He also had an offer from Bouygues, but working on site was less attractive somehow, although invaluable as an experience.

'I'd had a placement on a construction site when I was at school. It was quite horrifying; I was bricklaying at 15 in temperatures of -20°C . The mortar deliveries came on site heated, so I would stick my hands in to warm them up. I realised that working on site wasn't for me, but the construction process got me interested in finding out how things work, the mechanics of materials and so on.'

At Waterman in Moscow, Vasilchenko-Malishev was part of a small team with a very busy workload; hence, his learning curve was very steep indeed. 'One of the projects I worked on from beginning to end was the Anglo-American School; I was just a graduate, but I was resolving issues with the builders on site. It gave my confidence a boost and built up my experience, so when I had the chance to move to London in 2000, I was well prepared for it.'



Figure 2
Glass box for Daman
Buildings in Dubai

Forging a creative path

London at the millennium was an exciting place to be. Vasilchenko-Malishev enjoyed working at Waterman, but 'I was seeing all the weird and wonderful architecture all around me. And I remember I was reading *The Fountainhead*^{*} at the time, which sparked something inside me, so I decided to try something new.'

He joined Dewhurst MacFarlane and Partners, a practice which 'pretty much single-handedly revolutionised the market in structural glass and was at the forefront of creative engineering,' he remembers. 'There was a super-creative atmosphere, unlike in your typical engineering office. The idea of designing sculptures and things like this didn't even cross my mind when I was starting my career. I stayed for four years and it was a wonderful formative time working on a variety of

projects like the first Apple Stores in Los Angeles, a lighting sculpture in Valencia, the new Alpine House at Kew Gardens, the Ford sculpture at the Goodwood Festival of Speed in 2003, and the refurbishment of the Rotunda building in Birmingham. My former colleagues and I call Dewhurst MacFarlane a university because a lot of talented engineers "graduated" from there and built successful careers.'

Little by little, Gennady started bringing his own projects into the practice. When he became chartered with the Institution of Structural Engineers in 2003, he thought about setting up his own practice, an idea which had been nagging at him since university.

He teamed up initially with fellow engineer Philip Wilson, and the pair started working as designers for glass and steel fabricators, which gave them a new education. 'We were not just doing scheme design, but getting involved at the manufacturing

and construction levels. They want easily executable solutions and fast. So you can design very clever and nice-looking things, but if the builder can't put it together, you clearly haven't done your job.

'I realised from working directly with fabricators that the role of the engineer is not just doing calculations, but also to correctly interpret and communicate an architect's idea into technical language so that it can be constructed. Quite often it is also about finding open-minded contractors/fabricators who are willing to experiment with something that has never been done before.'

Glamour and challenges

The audacious projects are the ones that attract him. The Mariinsky II theatre extension was certainly a challenge – 'one the best projects I have ever worked on' – because it required a combination of engineering creativity, decision making and good communication with the contractor. 'It's funny that when the competition scheme [initially by Dominique Perrault] was published in a magazine, I thought to myself, "I want to get involved in this". Little did I know that in about 10 years I would be. The first scheme was dogged by technical issues and the client was forced to change the entire team, which is why it took so long.

'The stairs (five in total, mostly hung) had been looked at by two engineers previously and both concluded that they had issues with dynamics. Plus, one of the stairs was in glass, which had never been done in a public building in Russia before. We were asked to help. Since the glazing world is relatively small, I was recommended to the client as the only Russian-speaking specialist in structural glass. But the glass stair was just the beginning. The whole thing had to be redesigned to address the dynamics.

'I knew how to resolve the dynamic issues (which halved the amount of steel proposed in the initial design), but it required a good steel fabricator to make this on time and within budget. So I

^{*} A 1943 novel by Ayn Rand. The novel's protagonist, Howard Roark, is an individualistic young architect who designs modernist buildings.

rang our steel fabricator friends at Waagner Biro in Austria and put them in touch with local contractors. Effectively, I put the team together, which I hadn't done previously – so it was all very exciting. Working with the right builder on a complex project is an important part of the job.'

Having the right contractor is also crucial for glass structures, probably more so than for other materials, as glass is so unforgiving, says Vasilchenko-Malishev.

'We received an enquiry around 2011 for the 13m high glass box in Dubai, which was to be the tallest self-supporting glass box in the world, built in a region with seismic activity, high winds and extremely high temperatures at the height of summer. A pretty tall order. A lot of design and finite-element analysis went into that job, for which we not only did the structural design, but also produced fabrication drawings for the steel and glass.

'We also undertook regular site inspections for this project. Luckily, we knew the contractors from previous work, so communication was pretty good. One of the main issues we've found when working in the Middle East is quality control. The lack of a suitably qualified workforce can be a problem, as can its management due to the language barrier.

'On this project, our structure also required very tight tolerances, which ironically was more the case for the steel details than the glass. The concrete portal frames which cut through the glass are a feature remaining from a previous design and are not part of the structure. They are isolated by movement joints.'

'But despite all the international projects, the bulk of our work is still in the UK. Maybe less glamorous, but certainly no less challenging. The house in



Figure 3
Victorian Remix
project, Clapham,
London

Clapham is a good example. 'On this job we needed to pull all our expertise (not just in glass, but in steel, composite timber and masonry) together. The architect was struggling with space and I found that by using a slimmer composite timber floor, it would create the room required for the services. Everything else came from that.

'It was a good experience. When an architect feels confident they can achieve something, they can push their engineer to the limit. It was stressful, but fun,' he says.

Also stressful is running a business, he adds. 'It's not as rosy as many people think and certainly requires a different set of skills and a lot of commitment. If you thought about it at the start, it would put you off. But it's exciting, you are in control and though you have to balance time for technical design with business issues, you have no choice but to be on top of it all.

'I never thought of myself as being good at multitasking, but it turns out that maybe I am.'

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